Claims

1. Power converter for transforming energy from a green power unit into energy fed to a grid, the power converter comprising a DC/DC-converter which forms a first module and a DC/AC-inverter which forms a second module, characterised in that the first module (A) comprises a first controller (1) and power switches (18,41,42) controlled by said first controller, that the second module (B) comprises a second controller (2) and power switches (14,48) controlled by said second controller, that the first and second controller perform communication with each other via a communication bus (5) and that the first module further comprises a transformer (10) connected to the corresponding switches. said transformer transferring energy to the second module.

2. Power converter according to claim 1 c h a r a c t e r i z e d in that the first module comprises an inverter (18) which is current sourced and that the second module comprises an inverter (14) which is voltage sourced.

3. Power converter according to claim 2 c h a r a c t e r i z e d in that an interface (4) between the first and the second module is formed between a rectifier (8) on the first module and a DC-bus on the second module.

4. Power converter according to claim 3 c h a r a c t e r i z e d in that the first module comprises an integrated power module (26) that incorporates an H-bridge (27) of power switches and a full bridge rectifier (28).

5. Power converter according to claim 3 c h a r a c t e r i z e d in that two first modules (A,A') are electrically connected to the second module.

6. Power converter according to claim 2 c h a r a c t e r i z e d in that an actual amplitude of a voltage ripple on the DC voltage of the second module, or an actual phase angle of a ripple on the power delivered to the grid, is measured and converted into a duty cycle compensation value which is added to a duty cycle of the switches (18) of the first module.

7. Power converter according to claim 2 c h a r a c t e r i z e d in that the first and the second controller communicate via a galvanically separated serial bus (5).

8. Power converter according to claim 7 c h a r a c t e r i z e d in that a man-machine interface module (M) is connected to the serial communication bus.

9. Power converter according to claim 2 c h a r a c t e r i z e d in that a snubber circuit (25, 51,52,53,54) is placed in front of the inverter (27, 41,42) of said converter.

10. Power converter according to claim 9 c h a r a c t e r i z e d in that the snubber circuit (25) comprises a switch connected to a snubber capacitor (30) storing energy from the transformer (10), that the switch (33) is connected to the first controller (1), and that the first controller pulse width modulates the switch through which energy from the capacitor is led to the DC-input of the converter.

11. Power converter according to claim 10 c h a r a c t e r i z e d in that the first controller calculates a voltage set point as a function of the voltage supplied from the green power unit (15), and that the switch is modulated to keep a voltage across the capacitor (30) corresponding to said voltage set point.

12. Power converter according to claim 2 c h a r a c t e r i z e d in that the DC/DC-converter is started in a discontinuous current mode during which a duty cycle is increased by a duty cycle generator until a limit value is reached, that the DC/DC-converter is operated on this limit value for a first time period, whereafter in a second time period it is operated in a continuous current mode.

13. Power converter according to claim 2 c h a r a c t e r i z e d in that the DC/DC-converter comprises an H-bridge (18) consisting of power switches.

14. Power converter according to claim 13 c h a r a c t e r i z e d in that at least one current sensor (29), preferably a shunt, is inserted in the minus conductor of the inverter of the first module and the inverter of the second module respectively, and that the current signals are led to the first and second controller respectively.

15. Power converter according to claim 2 c h a r a c t e r i z e d in that the DC/DC-converter comprises a push pull converter (41,42,10).

16. Power converter according to claim 15 c h a r a c t e r i z e d in that the DC/DC-converter is started in a discontinuous current mode during which a duty cycle is increased by a duty cycle generator (46) until a limit value is reached, whereafter the DC/DC-converter enters a continuous current mode in which the duty cycle generator freely generates the duty cycle to regulate the current in the DC/DC-converter.

17. Power converter according to claim 16 c h a r a c t e r i z e d in that the limit value is a minimum simultaneous conduction time (D_{LTL}) or minimum overlap in duty cycle of the switches (41,42) in the DC/DC-converter.

18. Power converter according to claim 17 c h a r a c t e r i z e d in that after reaching the limit value the duty cycle generator (46) keeps the duty cycle

approximately constant at a minimum overlap for a period of time during a transition zone between the discontinuous current mode and the continuous current mode.

19. Power converter according to claim 15 c h a r a c t e r i z e d in that a current reference for the current in a coil (40) of the push pull converter is regulated stepwise until an optimum operating voltage of the green power unit is reached.

20. Power converter according to one of the preceeding claims c h a r a c t e r i z e d in that the second controller controls the inverter of the second module by means of two control loops, a current control loop regulating the shape of current supplied to the grid similar to the shape of the grid voltage, and a voltage control loop regulating the amplitude of the current supplied to the grid.

21. Power converter according to one of the preceeding claims c h a r a c t e r i z e d in that the first controller is connected to minus (M1) of the first module, and that the second controller is connected to minus (M2) of the second module.

22. Power converter according to one of the preceeding claims c h a r a c t e r i z e d in that a filter (13, 47) is inserted between an output of the inverter (14,48) on the first module and the grid, said filter comprising a sequence of a first coil (Z_i), a capacitor (Z_o) and a second coil (Z_g).

23. Power converter according to claim 21 c h a r a c t e r i z e d in that a damping resistor is connected in parallel with the second coil (Z_g).